

Translation

PATENT COOPERATION TREATY  
PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

PCT Application  
PCT/JP2003/004063



Applicant's or agent's file reference 03PCFP848	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/JP2003/004063	International filing date (day/month/year) 31 March 2003 (31.03.2003)	Priority date (day/month/year) 03 April 2002 (03.04.2002)
International Patent Classification (IPC) or national classification and IPC H01L 21/768, 21/302		
Applicant NEC CORPORATION		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 5 sheets, including this cover sheet.  
☐ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).  
These annexes consist of a total of \_\_\_\_\_ sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☒ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 31 March 2003 (31.03.2003)	Date of completion of this report 25 December 2003 (25.12.2003)
Name and mailing address of the IPEA/JP	Authorized officer
Facsimile No.	Telephone No.

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## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

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## I. Basis of the report

## 1. With regard to the elements of the international application:\*

- ☒ the international application as originally filed
- ☐ the description:  
pages \_\_\_\_\_, as originally filed  
pages \_\_\_\_\_, filed with the demand  
pages \_\_\_\_\_, filed with the letter of \_\_\_\_\_
- ☐ the claims:  
pages \_\_\_\_\_, as originally filed  
pages \_\_\_\_\_, as amended (together with any statement under Article 19  
pages \_\_\_\_\_, filed with the demand  
pages \_\_\_\_\_, filed with the letter of \_\_\_\_\_
- ☐ the drawings:  
pages \_\_\_\_\_, as originally filed  
pages \_\_\_\_\_, filed with the demand  
pages \_\_\_\_\_, filed with the letter of \_\_\_\_\_
- ☐ the sequence listing part of the description:  
pages \_\_\_\_\_, as originally filed  
pages \_\_\_\_\_, filed with the demand  
pages \_\_\_\_\_, filed with the letter of \_\_\_\_\_

## 2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language \_\_\_\_\_ which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

## 3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages \_\_\_\_\_
- ☐ the claims, Nos. \_\_\_\_\_
- ☐ the drawings, sheets/fig \_\_\_\_\_

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).\*\*

\* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rule 70.16 and 70.17).

\*\* Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

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## V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

## 1. Statement

Novelty (N)	Claims	2-4, 6-11, 13, 14, 17, 18	YES
	Claims	1, 5, 12, 15, 16	NO
Inventive step (IS)	Claims	10, 11, 13, 14	YES
	Claims	1-9, 12, 15-18	NO
Industrial applicability (IA)	Claims	1-18	YES
	Claims		NO

## 2. Citations and explanations

Document 1: JP 2000-114367 A (Matsushita Electronics Corp.), 21 April 2000, entire text, fig 1-4

Document 2: JP 10-125783 A (Sony Corp.), 15 May 1998, entire text, fig. 1-8

Document 3: JP 11-297829 A (NEC Corp.), 29 October 1999, entire text, fig. 1-6

Claims 1, 5, 12, 15 and 16

Documents 1-3 cited in the international search report disclose semiconductor devices wherein a modified portion that contains nitrogen atoms is provided at the position that faces the opening in the organic insulating film, and disclose production methods for semiconductor devices wherein an opening is formed in the organic insulating film by means of etching and thereafter a modified portion is formed by means of plasma processing or the like involving nitrogen atoms.

Consequently, the inventions that are set forth in claims 1, 5, 12, 15 and 16 of this application are disclosed in documents 1-3; therefore, they lack novelty and do not involve an inventive step.

Document 4: US 6114250 A (Lam Research Corp.), 05 September 2000, entire text, fig. 1-8

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Document 5: JP 2000-26484 A (Tokyo Electron Ltd.), 02  
February 2000, entire text, fig. 1-14

Claims 2-4, 6-9, 17 and 18

Documents 4 and 5 cited in the international search report disclose the feature of using nitrogen gas to etch an organic insulating film, document 5 (chart 6) indicates that  $\text{CH}_2\text{F}_2$  gas is added to the etching gas, and document 4 indicates that fluorocarbons are added in order to control the form of the film. It would be obvious to a person skilled in the art to employ the etching means that are disclosed in documents 4 and 5 in order to form openings in the semiconductor devices that are disclosed in documents 1-3, and, at that time, it would be obvious to form a modified portion that includes nitrogen atoms (and fluorine atoms) at the position that faces the opening in the organic insulating film.

Therefore, the inventions set forth in claims 2-4, 6-9, 17 and 18 do not involve an inventive step in the light of documents 1-5.

Claims 10, 11, 13, 14

The invention that is set forth in claims 10, 11, 13 and 14 is not disclosed in any of the documents cited in the international search report, and is not obvious to a person skilled in the art.

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## VI. Certain documents cited

### 1. Certain published documents (Rule 70.10)

<u>Application No. Patent No.</u>	<u>Publication date (day/month/year)</u>	<u>Filing date (day/month/year)</u>	<u>Priority date (valid claim) (day/month/year)</u>
JP 2003-92287 A [E, X]	28 March 2003 (28.03.2003)	19 September 2001 (19.09.2001)	
JP 2002-110788 A [E, X]	12 April 2002 (12.04.2002)	27 September 2000 (27.09.2000)	

### 2. Non-written disclosures (Rule 70.9)

<u>Kind of non-written disclosure</u>	<u>Date of non-written disclosure (day/month/year)</u>	<u>Date of written disclosure referring to non-written disclosure (day/month/year)</u>

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